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# A FRAMEWORK FOR SMEs' ADOPTION OF CLOUD AND OPEN SOURCE ACCOUNTING INFORMATION SYSTEMS

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## Abstract

*Although Cloud and Free/Open Source Software (FOSS) has gained a reputable status in the IT/IS domain, this is not the case with business computing and especially with accounting software which penetration in the market worldwide is rather limited. Recent market trends show however that Cloud and FOS accounting software is an emerging phenomenon and it may provide a viable alternative to propriety accounting software, especially for Small and Medium Size Enterprises (SMEs). SMEs have limited funds and other resources and are generally considered to be among the organizations that are to be benefited by the existence of Cloud/FOS accounting and business software. This paper presents the preliminary findings of a literature review aiming at identifying variables that play a significant role on the decision of SMEs to adopt cloud or FOS accounting and enterprise information systems. Organizational, business policy, environmental, technological and accounting information system characteristics are examined. The study will also report the results of a survey aiming at providing a framework of key success factors for SMEs' adoption of Cloud/FOS accounting systems which will be a useful resource for scholars, researchers and managers engaging in similar projects.*

*Keywords: Accounting Information Systems, Free Open Source Software (FOSS), Cloud computing, SMEs*

# 1 INTRODUCTION

Recently, open source has become a part of the IT infrastructure of organizations (Madsen, 2009) and Free/Open Source (FOS) integrated information systems are gaining interest in providing an alternative solution to proprietary integrated enterprise software (Carvalho, 2006). However, FOS integrated Accounting Information Systems (AIS) as well as Enterprise Resource Planning (ERP) software is still viewed with much skepticism by the majority of enterprises worldwide despite reduced IT budgets due to economic recession (Jutras, 2009). It is generally regarded that SMEs are to be benefited by the existence of cloud/FOS applications but this is certainly an under researched area.

The objective of the paper is to identify variables that play a significant role on the decision of SMEs to adopt cloud or FOS accounting and enterprise information systems and provide a framework of KSF for SMEs adopting Cloud and FOS AIS software. It is argued that Cloud/FOS-AIS is not a suitable solution for all companies. Organizational, environmental and AIS characteristics in relation to company's needs, play a significant role in adopting a cloud/FOS AIS. The paper aims at informing scholars and researchers having an interest in this emerging area of business software. In the field of practice, it will provide managers with knowledge required in making decisions regarding the acquisition of FOS AIS.

The paper is organized as follows: Next section discusses cloud computing and Open Source Software (OSS) in order to define the backdrop of FOS accounting systems. The following section provides a literature review on FOS-AIS and the subsequent one presents the results of a survey regarding SMEs adoption of FOS-AIS. The final two sections offer suggestions for future research related to adoption of FOS-AIS by SMEs and final conclusions.

# 2 CLOUD COMPUTING AND OPEN SOURCE SOFTWARE

Cloud computing has recently emerged as one of the most promising and revolutionizing approaches of computing. According to WinterGreen Research (2009) cloud computing market comprised of search engines, communications technology, and application development, is expected to reach \$160.2 billion by 2015 compared to \$36 billion in 2008.

Web 2.0 and Open Source are seen as the perfect background for cloud computing (Sharif, 2009). It is apparent that the undeniable success of Web 2.0 social networking applications have certainly facilitated the promotion of the idea of collaborative software and the acceptance of the notion that the internet can be a respected, secure transportation platform, even for critical business applications such as the AIS on which all or most of the organizational core functions depend upon. AIS provides the hub that holds together all modern ERP subsystems and its usefulness for any organization regardless of its size is unquestionable. According to Wu and Lao (2009) Web 2.0 may be used to reduce the cost, improve the quality and lower the risk of ERP implementations by providing, for example, a repository system that supports ERP application implementations. Whether SMEs would be benefited from such applications depends upon certain conditions such as the organizational level of IS knowledge and the extent and depth of the required AIS/ERP implementation.

Open source software allows users to have access to the software's code. This allows every user to modify the software according to specific business needs contributing at the same time together with a worldwide community of users to make the software better, customizable to provide solutions and satisfy various needs at various situations and with fewer code errors and limitations. Free access to its source code does not render software the open source status; according to Open Source Initiative ([www.opensource.org](http://www.opensource.org)) free redistribution of the license is

among the criteria that OSS should comply. This can be a critical issue for SMEs regarding their AIS, as companies may wish not to redistribute certain accounting applications and methodologies, such as dashboards and BI tools or costing models which may consider company's own critical and competitive resources.

### **3 FOS-AIS AND SMEs**

SMEs are the backbone of the economy of many countries around the world. SMEs face today the challenge of a continuous changing, globalized and extremely competitive economic environment. Advances in the information and communication technologies as well as the widespread phenomenon of web-based applications and markets, impose even in the small companies the need to invest in modern integrated, enterprise-wide information systems in order to remain competitive. However, SMEs differ significantly from large enterprises as far as information technology (IT) acceptance and information systems (IS) acquisition practices are concerned (Ramdani and Kawalek, 2009, Buonanno et al., 2005) SMEs have limited resources and they cannot afford to acquire, implement and operate a standard integrated AIS/ERP solution offered by large ERP vendors such as SAP and Oracle.

Seethamraju and Seethamraju (2008) provide a discussion of the external and internal factors forcing SMEs to adopt ERP systems. External factors are, for example, e-procurement initiatives forcing SMEs to adapt to them if they want to stay in the market and powerful supply chain partners who require their partners to upgrade their information systems in order and achieve transactional efficiency. Internal factors, such as the need to remain competitive and cost-efficient, force SMEs to acquire ERPs in order to streamline their processes and reduce costs.

Understandably, the penetration of standard AIS/ERP systems in the mid-market segment is not too high. It is also true that, until recently, SMEs attracted limited attention by vendors of large ERP packages or in any case SMEs were certainly not their first priority. This situation changes today; saturation of the ERP market for the big clients and pressures from the OSS front, have reversed this trend. Many traditional ERP vendors, SAP being no exception, have developed products that aim at mid market clients. These are pre-configurable, limited functionality and low cost options compared to the state-of-art systems.

Recently, another significant option, FOS-ERP systems, became available to SMEs and seem to be of an increasing interest today either as a result of dissatisfaction with proprietary ERP systems or as a result of maturity in the open source phenomenon (B. Johansson and F. Sudzina, 2008).

However, it is not yet clear which is the best option for companies to acquire software. In a recent study of ERP selection criteria based on literature review, Johansson and Sudzina (2009) could not conclude whether open source or proprietary solutions are more suitable for the majority of the organizations.

It is widely accepted, however, that Small and Medium Size Enterprises (SMEs) are among the organizations that are to be benefited by the FOSS trend for a variety of reasons (see e.g. Bueno and Callego, 2010). At the same time and despite positive prospects, many issues have to be resolved and there are certain risks in adopting a FOS accounting solution. These will be discussed in the final version of the paper.

## 4 FUTURE RESEARCH DIRECTIONS

Despite the importance of FOS –AIS/ERP for modern mid-sized companies, research on the subject is quite limited. The growing penetration of FOS-ERP systems especially in the SMEs market, calls for future research that should analyze and provide frameworks and guidelines for the selection process, the implementation and the operation of FOS accounting software. The ex-post evaluation of FOS-AIS systems is also of paramount importance in identifying its impact on the organization. Web 2.0 ERP implementation is a collaborative approach quite different from the traditional collaboration software development. Research is needed to evaluate the merits and drawbacks and identify key success factors of these models providing an assessment of their potential customer value.

## 5 CONCLUSIONS

Cloud computing, Web.2.0 and open source software have the potential to revolutionize the way accounting software is developed and distributed. The impact of these emerging technologies is also evident in the upper AIS/ERP market. OS gives companies a clear alternative to the traditional way of acquiring accounting software. The paper in its final form will present a framework of SMEs adoption of cloud/FOS AIS. Low capital budgets, limited IT infrastructures, tight contracts and vendor lock-in are barriers for most SMEs to acquire a propriety AIS but SMEs have now an opportunity window to adopt an FOS/AIS solution in their effort to remain competitive. The growth of FOS-AIS/EPR market is spectacular and is expecting to increase in the coming years, providing an indication of the relevance of FOS-ERP systems mainly to SMEs.

This endeavor, however, is not without risks; firstly, the TCO of implementing a FOS/AIS solution is not easily anticipated and there are indications that can be very high in the long run. A high TCO will absorb resources the value of which is difficult to be assessed and calculated at the outset, and this could be devastating for the adopting company. Secondly, the functionality of the software may be quite limited in case of SMEs which wish to expand, add, modernize or reengineer their business processes, and have substantial new information requirements. The same holds in the case these SMEs need to be partners in supply chains where information systems compatibility and efficiency is required. Thirdly, data security, accessibility and availability in case of hosted/web-based applications are not guaranteed. This is maybe not a critical problem for newly established companies, but it can be a serious one for companies operating in the market for a long time and especially when critical decisions they make are based on these data.

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